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HARD CHOICES

A Report on the Increasing Gap Between America's Infrastructure Needs and Our Ability To Pay for Them

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Appendix 6. KENTUCKY

A CASE STUDY

PREPARED FOR THE USE OF THE

SUBCOMMITTEE ON ECONOMIC GOALS AND INTERGOVERNMENTAL POLICY

OF THE

JOINT ECONOMIC COMMITTEE
CONGRESS OF THE UNITED STATES

FEBRUARY 25, 1984

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Preface

Infrastructure problems are widespread. They do not respect regional or state boundaries. To secure a better data base concerning national and state infrastructure conditions and to develop threshold estimates of national and state infrastructure conditions, the Joint Economic Committee of the Congress requested that the University of Colorado's Graduate School of Public Affairs direct a twenty-three state infrastructure study. Simultaneously, the JEC appointed a National Infrastructure Advisory Committee to monitor study progress, review study findings and help develop policy recommendations to the Congress.

In almost all cases, the studies were prepared by principal analysts from a university or college within the state, following a design developed by the University of Colorado. Close collaboration was required and was received from the Governor's staff and relevant state agencies.

Because of fiscal constraints each participating university or college agreed to forego normal overhead and each researcher agreed to contribute considerable time to the analysis. Both are to be commended for their commitment to a unique and important national effort for the Congress of the United States.

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KENTUCKY'S PUBLIC INFRASTRUCTURE NEEDS: CAPITAL INVESTMENT PLANNING AND BUDGETING

By:

Phillip W. Roeder
and
Dennis B. Murphy

Bureau of Policy Research
Martin Center for Public Administration
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October, 1983

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Phillip W. Roeder
Dennis B. Murphy

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EXECUTIVE SUMMARY

INTRODUCTION

Considerable attention has focused, over the past year, on the condition of our nation's public infrastructure. The existing infrastructure has been found to be inadequate to meet the needs of a growing society. These inadequacies result from the combined effects of deteriorating facilities, due to age and/or lack of maintenance, and pressures exerted by the demands of changing technologies. Generally, this condition has been worsened by the revenue implications of the longest and deepest economic recession since the 1930's and high rates of interest which have made it increasingly difficult for state governments to maintain an acceptable public infrastructure system. Furthermore, the Federal government's commitment to finance infrastructure maintenance, repair, and expansion appears to be declining. As a result, the states have been placed in the difficult position of attempting to maintain an adequate infrastructure to meet society's needs without having the necessary resource base to do so. Consequently, all levels of government must analyze their present and future infrastructure actions carefully so that effective decisions can be made for the present and future financing of public infrastructure needs.

A clear, concise definition of our what is meant by the term "public infrastructure" is needed in order to be able to deal with relevant public/private sector and intergovernmental issues. In practice, the terms "infrastructure," "public works," and "public capital investment," have been used interchangeably. However, the terms often refer to different public sector investment efforts. Public works refers to works constructed by the government for the public's use or service. Public capital investment is a somewhat more inclusive term than public works and typically refers to the tangible, long-term investment made by government for physical structures. However, the most inclusive term and the one used throughout our discussion and study is infrastructure, which refers to the basic installations and facilities on which the life and economic growth of a community or state depend.

To futher define the term, infrastructure can be broken down into three categories which permit us to deal more effectively with intergovernmental relationships and responsibilities. These categories are as follows:

Basic Infrastructure

The basic, traditional infrastructure system includes highways, public transit, airports, municipal water supply, wastewater treatment, and other investments in basic public service facilities.

Human Services Infrastructure

The human service infrastructure is defined as state and local government programs to meet human service needs, for educational, humanities, or correctional facilities.

Development Infrastructure

The newest category is development infrastructure, which has emerged over the past several years and involves direct state and/or local government investment in specific economic development and revitalization projects, as civic centers, parking garages, hotels, and other joint public/private ventures. In a time of record-high interest rates and a depressed economy, involvement in these development infrastructure projects has emerged as a major public sector activity. Such risk sharing efforts have the ultimate goal of enhancing the general economic welfare by making substantial public financial commitments to economic development as financed by state and local bonded indebtedness.

IMPORTANCE OF INFRASTRUCTURE

The importance of infrastructure to Kentucky is considerable. The Commonwealth's agricultural and coal mining economy requires a modern and efficient transportation system. In addition, the projected growth of Kentucky's population (nearly thirty percent by 2000, Table 18) occurring predominately in the rural areas of the state, will require a sizable investment in drinking water and wastewater treatment facilities to meet acceptable quality standards.

Precise relationships between infrastructure condition and economic development and industrial location decisions have not been fully established. However, since the initial size and distribution of infrastructure investment is influenced significantly by the

existing distribution of population and economic activity, there appears to be a positive correlation between population and economic activity, infrastructure investment, and private investment and location decision. This theory is supported by a Census Bureau survey conducted in the mid-1970s for the Economic Development Administration which examined over 2,000 firms operating in 254 product classes.[1] A majority of the respondents stated that the availability of adequate infrastructure facilities was either of critical or significant importance to locational decisions. Infrastructure facilities were viewed more favorably by respondents when making locational decisions than were local tax or industrial revenue bond financing incentives.

The second and third categories of infrastructure are also very important to Kentucky. The Commonwealth is presently under a court order to reduce the population in its existing correction facilities. Sixty-six million dollars in state bonds will be requested over the next biennium to finance the capital investment needs of the state correction system. The state's mental hospitals are old and in need of replacement. The 1982 Session of the Kentucky General Assembly authorized the sale of $20 million in bonds to construct one new mental health facility and renovate another. In Kentucky, local school district construction is primarily a local funding responsibility. The current need for classroom facilities alone is estimated to be $340 million.[2]

Economic development financing has become a major thrust in Kentucky's infrastructure investment effort. In 1982, the Brown Administration sought and the legislature authorized the issuance of $100 million in bonds designed to assist the private sector in developing a strong, diversified economic development program. This program emphasizes the construction of industrial parks and the development of riverport, downtown and recreational facilities.

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1. Pat Choate and Susan Walters, "Public Facilities: Key to Economic Revival" American Federationist, (August 1981).

2. Kentucky Department of Education, "School District Construction Needs" (June 30, 1983).

Obviously, Kentucky is not the only state funding major economic development infrastructure activities. Many states and localities are emerging as the primary financers of not only economic development but also human resources infrastructure projects. While these are state programs and theoretically should be state funded, the needs and responsibilities often far exceed the capacity of these governments to finance the projects.

Finally, the basic category of infrastructure, which traditionally has been funded by all three levels of government, must be discussed. The need for this type of infrastructure investment is substantial both for Kentucky and the nation. The Congressional Budget Office in Public Works Infrastructure: Policy Considerations for the 1980's[3] estimated the annual capital needs for all states' traditional infrastructure programs for the years 1983-1990. Under current Federal policy, this amounts to over $53 billion in 1982 dollars, which includes $27.2 billion annually for highways, $6.6 billion annually for wastewater treatment facilities, and $7.7 billion annually for drinking water supply (Chart A).

Chart A
Estimated Annual Capital Needs for Selected Infrastructure Programs Under Current Federal Policy 1983-1990
(In Billions of 1982 Dollars)

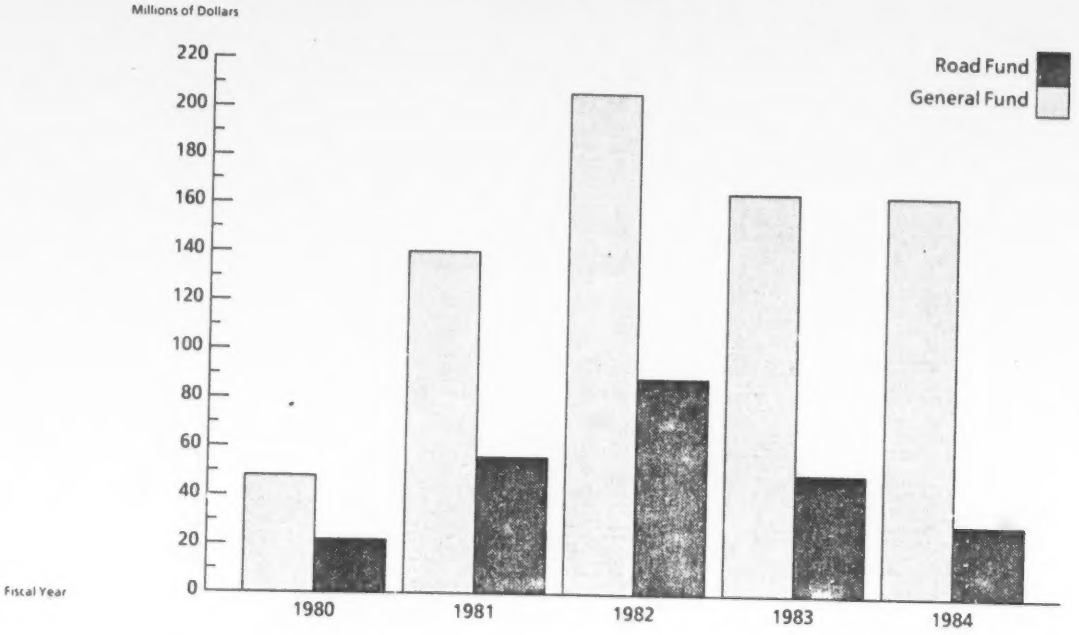
Infrastructure System	Total	New Construction	Repair, Rehabilitation and Replacement
Highways	27.2	9.9	17.3
Public Transit	5.5	2.2	3.3
Wastewater Treatment	6.6	6.1	0.5
Air Traffic Control	0.8	0.1	0.7
Airports	1.5	1.0	0.5
Municipal Water Supply	7.7	3.6	4.1
Total	53.4	25.2	28.2

Source: Congressional Budget Office, Public Works Infrastructure: Policy Considerations for the 1980's

3. Congressional Budget Office, "Public Works Infrastructure: Policy Considerations for the 1980s" (April 1983).

CHART B

State Tax Revenue Shortfalls During the Brown Administration*
(in million of dollars)



State Tax Revenue Shortfalls
(in million of dollars - rounded)

	FY 1980	FY 1981	FY 1982	FY 1983	FY 1984	Total
General Fund	48	140	206	165	164	723
Road Fund	23	56	89	50	30	247
						970

*In addition to these state tax revenue shortfalls, the Commonwealth has also experienced Federal budget cuts of approximately $900 million during this same period.

FY 1980 - 1983 data are actual.
FY 1984 data is estimated.

SOURCE: Finance and Administration Cabinet
Office for Policy and Management

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INFRASTRUCTURE AND FISCAL CONDITIONS

Unlike the Federal government, virtually all states are required to end their fiscal year without deficits; a requirement that is becoming increasingly difficult for most states to accomplish. Since 1980 Kentucky has experienced revenue shortfalls of $1 billion, in addition to $900 million in Federal funds lost over the same time period (Chart B).[4]

Although economic forecasters state that the national economy is growing and the recession ending, as of this writing most states have yet to experience an economic recovery. In fact, fiscal year 1983 saw more states implementing budget reduction strategies than in fiscal year 1982.[5] Twenty-seven states implemented across-the-board cuts in fiscal year 1983, up from seventeen in fiscal year 1982; twelve additional states implemented selective program cuts; twenty-seven states enacted permanent tax increases; and twenty-four states enacted temporary revenue enhancement measures. These tax increases, whether permanent or temporary, were not enacted to finance new or expanded programs but were necessary to maintain the existing revenue base.

Chart C
Summary Chart (50 States)
States Adopted Various Austerity Measures

Measure	Fiscal Year 1982	Fiscal Year 1983
Across-the-Board Cuts	17	27
Selective Program Cuts	25	37
Permanent Revenue Increases	12	27
Temporary Revenue Raising Measures	14	24
Capital Finance to Bonds	5	6
Move General Funds to		
Special Funds	8	17
Other Government Entities	1	3
Unpaid Employees Furloughs	4	9
Hiring Limits	37	42
Layoffs	20	22
Restricted Travel		
Out-of-State	24	32
In-State	16	23

Source: "Governors' Response to Fiscal Austerity" August 1983, National Governors' Association and National Association of State Budget Officers

4. Finance and Administration Cabinet, Office for Policy and Management, (June 1983).

5. National Governor's Association and National Association of State Budget Officers, "Governors' Response to Fiscal Austerity," (August 1983).

A survey by the National Governors' Association and the National Association of State Budget Officers provides further evidence of state financial problems when it reports that the aggregate surplus for state governments was $4.7 billion in fiscal year 1981, $2.3 billion in fiscal year 1982, and $0.5 billion in 1983. The 1983 surplus represents 0.2 percent of current expenditures. In fiscal year 1981, state taxes made up 48 percent of state income while non-tax revenue, including Federal grants, totalled 25.3 percent. By 1985, states' non-tax revenues are projected to decline to 16.4 percent.[6]

In addition to the reduction in Federal grants to the states, Federal tax changes in the Economic Recovery Tax Act (ERTA) of 1981 will affect state revenues negatively. The National Governors' Association estimates that accelerated cost recovery provisions contained in ERTA will result in $2 billion in revenue lost to the states from corporate taxes. Kentucky estimates ERTA will cost it $65 million per year.[7]

An explanation for the deterioration of the fiscal health of the states can be traced primarily to the deepest and longest recession this country has experienced in its history. However, there are three other contributing factors to the current fiscal plight of the states. The first factor was a drop in the rate of inflation from 10.3 percent in fiscal year 1981 to 3.3 percent in fiscal year 1983.[8] This decrease was not anticipated by state revenue forecasters; therefore, tax receipts from sales and individual income taxes which are affected by the inflation rate were not as high as expected. The second reason for the revenue decline was the fact that the recession followed so closely on the heels of the tax revolt movement that swept the country in the late seventies. Had this tax revolt been followed by a period of economic growth, state revenues might have been sufficient to maintain services; however, due to the long recession, state governments were forced to use existing surpluses and finally to cut services and raise taxes. The third factor was the reduction in Federal aid between fiscal year 1981 and fiscal year 1983 which placed additional burdens on state governments while revenues from traditional sources were stagnant or falling.

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6. IBID.

7. IBID.

8. Data Resources, Inc., Review of the U.S. Economy, (August 1983).

This reduction in the growth of state tax receipts came at a time when the non-tax revenue portion of the budget (Federal funds) decreased by 9 percent over 3 years and levels of mandated services remained substantially unchanged.

Considering the present fiscal condition of the states and projections of limited real growth in state revenues over the next several years, states must look elsewhere for financial support for basic public infrastructure system needs. This is especially important when one considers that states are almost totally responsible for funding the other major categories of infrastructure, i.e., human services, and quasi-public development.

A concern shared by many state and local governments is that at the same time the Federal government is reducing financial assistance to the states for Federally mandated programs in the health and welfare area, a similar trend appears to be emerging in Federal support for the basic public infrastructure system. The proportion of total spending on infrastructure activities undertaken by the Federal government declined between 1980 and 1982. Thus, the share of the burden borne by state and local governments has increased relatively. More importantly, this decline in Federal support, as estimated by the Congressional Budget Office, will continue. The Congressional Budget Office reports 1983 annual capital spending for the basic, traditional infrastructure system is about $53.4 billion. The Federal share of this total is approximately $28.2 billion, or 52.8 percent. This represents a decline from 54.6 percent in 1982 (Chart D).[9]

Chart D
Annual Spending on Capital Infrastructure
(In Billions of 1982 Dollars)

Year	Federal		State and Local		Total
	$	%	$	%	$
1960	14.0	41.8	19.5	58.2	33.5
1965	18.2	46.1	21.3	53.9	39.5
1970	16.7	41.3	23.7	58.7	40.4
1975	18.9	50.9	18.2	49.1	37.1
1980	22.0	55.4	17.7	44.6	39.7
1982	20.1	54.6	16.7	45.4	36.8

SOURCE: Congressional Budget Office, "Public Works Infrastructure: Policy Considerations for the 1980s," (April 1983)

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9. Congressional Budget Office, "Public Works Infrastructure: Policy Considerations for the 1980s" (April 1983).

It is obvious that financial resources needed to support infrastructure investment and maintenance is a problem of national scope. Declining government spending on infrastructure as a proportion of overall spending has occurred at the Federal as well as state and local levels. Spending by all levels of government on the infrastructure system has declined from 2.2 percent of Gross National Product (GNP) in 1960 to 1.3 percent of GNP in 1980.[10] The United States General Accounting Office points out that state and local capital investment as a percentage of total budget outlays declined from approximately 25 percent in 1960 to 14 percent in 1980.[11] Faced with revenue constraints and increased demands for services, many state and local governments have chosen to balance their budgets by deferring or eliminating capital investment and maintenance. When combined with similar reductions by the Federal government, it is apparent that the necessary financial commitments to the nation's infrastructure system may no longer be present.

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10. IBID.

11. General Accounting Office, "Effective Planning and Budgeting Practices Can Help Arrest the Nations Deteriorating Public Infrastructure" (PAD-83-2, November 18, 1982).

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Statement of Purpose

The ability to finance basic public infrastructure is becoming a major challenge to most states. Kentucky is currently pursuing a variety of capital planning initiatives to deal with emerging investment needs. These initiatives are coordinated through a Strategic Planning and Program Analysis (SPPA) process which will result in the Commonwealth having a five-year capital plan for the first time. Creation of a capital planning process obviously should include an assessment of the future infrastructure needs of the Commonwealth. In addition, Kentucky is cooperating with the Joint Economic Committee of Congress in their attempt to estimate the future infrastructure needs of the nation. This case study was designed to facilitate that effort and to:

1. Estimate the future infrastructure investment needs of the Commonwealth.

2. Suggest how these future needs can be incorporated into the capital budgeting and planning process.

3. Assist the Joint Economic Committee of Congress in their task of identifying the future infrastructure needs of the nation.

Scope and Methodology

Collection of data for this study was limited to basic infrastructure needs: highways and bridges, local streets and roads, mass transit, airports, railroads, water supply, wastewater treatment, and water resources. Human service and development infrastructure were not included due to the nature and limited scope of the study. Spending levels, past and future, were sought from Federal, state, and local levels of government for almost every infrastructure item. Varying degrees of success were experienced, depending upon data collection and planning efforts by relevant agencies.

Summary of Findings

A summary of study findings is presented in Table 1. Briefly, the investment need for highways and bridges through fiscal year 1989 is estimated to be $7,945 million and is

derived from a maintenance cost figure established by the University of Kentucky's Transportation Research Program document, Allocation of Transportation Costs to Users. A linear extrapolation to the year 2000 estimates investment needs for highways and bridges to be $20,430 in 1982 dollars.

By employing a population growth factor, water supply, treatment and distribution needs are estimated to be $672 million through fiscal year 1989, with a total need of $1.428 million through 2000. Wastewater treatment needs, as determined by the U.S. Environmental Protection Agency are $858.5 million through fiscal year 1989, and $3,080 million for 2000, which includes backlog needs.

Water resources infrastructure needs are estimated at $11 million for state-owned dam repair, $49 million for local flood control and $66 million for riverport development. All of these needs estimates are for fiscal year 1989. Estimates to year 2000 were impossible to make due to data constraints.

TABLE 1

SUMMARY OF FINDINGS
(Millions of 1982 Dollars)

		FY 1989 Needs	2000 Needs
I.	Transportation		
	A. Highways and Bridges	7,945	20,430
	B. Local Streets and Roads	Unknown	Unknown
	C. Mass Transit	52	134
	D. Airports	55	141
	E. Railroads	7	18
		FY 1989 Needs	**2000 Needs**
II.	Water Supply, Treatment and Distribution	672	1,428
III.	Wastewater Treatment	859	3,080
IV.	Water Resources		
	A. Dams	11	Unknown
	B. Flood Control	49	Unknown
	C. Riverports	66	Unknown

In total, an estimated $9,716 million in fiscal year 1989 needs were identified, while an estimated $25,231 million in needs through year 2000 were identified.

When considering these estimates, it should be noted that only recently has progress been made in developing planning and budget documents for future infrastructure needs.

Population Projections

Preliminary population projections for Kentucky, as made by the Urban Studies Center, University of Louisville, reveal a moderate increase in the Commonwealth's population by year 2000 (Table 2). A breakdown of the population growth by Area Development District reveals the following general distribution:

TABLE 2

POPULATION PROJECTIONS FOR KENTUCKY AND ITS AREA DEVELOPMENT DISTRICTS

	1980	1985	1990	2000
STATE	3,660,777	3,909,081	4,215,927	4,746,164
Barren River	217,041	232,517	250,424	280,472
Big Sandy	181,759	207,559	237,905	293,860
Bluegrass	547,280	591,101	641,660	725,414
Buffalo Trace	54,636	57,398	60,708	66,533
Cumberland Valley	227,557	250,751	278,582	329,445
FIVCO	140,734	151,149	163,023	183,543
Gateway	66,340	71,588	78,584	91,298
Green River	199,048	210,063	222,908	244,291
KIPDA	804,395	832,726	877,798	959,667
Kentucky River	134,437	148,745	166,164	198,243
Lake Cumberland	171,049	187,345	206,106	238,119
Lincoln Trail	217,666	231,756	249,606	276,550
Northern Kentucky	313,550	329,630	350,162	286,766
Pennyrile	204,937	218,779	234,767	259,595
Purchase	180,348	187,974	197,530	212,368

SOURCE: Urban Studies Center, University of Louisville.

Perhaps the most interesting point of these projections is that the more rural eastern ADDs are projected to have the greatest percentage of population growth, while the more urban ADDs are projected to experience a smaller percentage growth (Table 3).

TABLE 3

SELECTED POPULATION PROJECTIONS BY ADD

Rural ADDs	1980	2000	% Growth
Big Sandy	181,759	293,860	61.67
Cumberland Valley	227,557	329,445	44.77
Kentucky River	134,437	198,243	47.50
Urban ADDs			
KIPDA (Louisville)	804,395	959,667	19.3
Bluegrass (Lexington)	547,280	725,414	32.55
Northern Kentucky	313,550	386,766	23.36

SOURCE: Urban Studies Center, University of Louisville

The implications of these projections are significant for infrastructure planning and analysis. Population growth in rural areas which have insufficient transportation, water supply, and wastewater treatment systems may result in the need to construct billions of dollars of new systems. Failure to develop these systems may constrain projected growth. Furthermore, small population increases for urban areas may lead to a decline in municipal tax bases relative to rural areas and the increased need to finance the construction or reconstruction of urban infrastructure items from Federal and state dollars.

Projections of Economic Activity

Economic activity projections for Kentucky are provided by the Bureau of Economic Analysis, U.S. Department of Commerce. Through a contractural arrangement with the Tennessee Valley Authority and the Army Corps of Engineers, the Bureau of Economic Analysis projected county-level economic activity for each of the nine southeastern states. The final document, County-Level Projections of Economic Activity and Population - Kentucky, 1985 - 2040 summarizes the future economic activities of the Commonwealth, as presented in Table 4A and 4B (in 1972 dollars).

TABLE 4A

TOTAL PERSONAL INCOME, POPULATION, PER CAPITA INCOME, AND EARNINGS BY INDUSTRY FOR KENTUCKY

Selected Years 1969 - 2000

(T.P.I. and Earnings in Millions of 1972 Dollars; Per Capital Income in 1972 Dollars)

	1969	1978	1985	1990	1995	2000
Total Personal Income	10,362	15,459	21,725	26,732	31,569	36,859
Population (Number)	3,198,000	3,489,547	3,901,443	4,092,141	4,270,624	4,387,845
Per Capita Income	3,240	4,430	5,568	6,533	7,392	8,400
Per Capita Relative (U.S. = 100)	78	85	89	91	93	95
Total Earnings	8,273	11,901	17,005	21,032	24,825	29,187
Agric. Production	500	496	557	605	667	732
Agr. Svs, F. + F.	20	33	41	47	51	56
Mining	267	854	1,582	2,122	2,562	2,973
Construction	630	812	1,163	1,402	1,613	1,853
Total Manufacturing	2,118	3,107	4,292	5,252	6,180	7,337
Nondurable Goods	903	1,182	1,533	1,832	2,108	2,446
Durable Goods	1,214	1,925	2,759	3,420	4,072	4,892
Transp., Comm., + P.U.	581	889	1,239	1,528	1,807	2,139
Wholesale Trade	374	639	919	1,117	1,304	1,521
Retail Trade	906	1,143	1,621	1,984	2,341	2,731
Finance, Ins., + R.E.	319	468	713	905	1,087	1,305
Services	1,083	1,566	2,414	3,117	3,798	4,583
Total Government	1,474	1,894	2,463	2,951	3,415	3,957

TABLE NOTES

Population for projected years is based on the Census Bureau's April 1, 1980, Census Counts, which may not be consistent with population estimates for previous years.

SOURCE: Bureau of Economic Analysis, Regional Economic Analysis Division.

TABLE 4B
EMPLOYMENT BY INDUSTRY
Selected Years 1969 - 2000
(Total Number of Jobs)

	1969	1978	1985	1990	1995	2000
Total Employment	1,213,482	1,482,035	1,763,248	1,915,754	2,016,803	2,111,733
Agric. Production	86,735	83,438	75,988	72,531	70,604	68,338
Agr. Svs., F., + F.	4,342	6,322	6,981	7,133	7,113	7,140
Mining	26,827	52,972	80,956	94,998	100,759	102,809
Construction	73,516	91,691	110,228	116,402	118,873	120,930
Total Manufacturing	253,176	298,258	343,439	369,001	388,789	409,940
Transp., Comm., + P.U.	63,789	74,992	84,431	89,982	93,678	97,179
Wholesale Trade	41,700	65,936	81,178	88,812	93,709	98,565
Retail Trade	176,197	229,325	280,219	307,541	327,795	346,079
Services	200,780	256,758	324,978	366,632	395,666	423,997
Total Government	248,141	268,466	302,422	320,439	330,835	340,479

SOURCE: Bureau of Economic Analysis, Regional Economic Analysis Division.

In the following sections, a presentation of historical expenditures, investment needs and future funding sources for each of the four major categories of basic infrastructure will be made. In Section I, various modes of transportation infrastructure are analyzed. These modes include highways and bridges, city maintained streets and county maintained roads, mass transportation, airports and railroads. In Section II, estimates are presented for publicly-owned wastewater treatment facility needs in Kentucky. The projected investment needs for water supply, treatment and distribution are presented in Section III. In the final section, needs estimates for the water resources categories of local flood control, dams and riverports are discussed.

SECTION I: TRANSPORTATION

The provision of public roads in Kentucky has been a responsibility of state government since 1779, when legislation was passed by the General Assembly empowering Joseph Crockett to erect a turnpike on the road leading from Crab Orchard to Cumberland Cap.[12] It was not until 1912 that a Department of Highways was established as an agency of the Commonwealth. Executive Orders 72-288 and 73-543, as confirmed by the 1974 General Assembly, created the Department of Transportation by combining the existing Department of Highways, Department of Motor Vehicle Regulation, and Department of Aeronautics. Through legislation enacted in 1982, the Transportation Cabinet was established and took on the responsibilities of the Department of Transportation.

Highways and Bridges

Currently, the Transportation Cabinet is responsible for the construction, reconstruction, and maintenance of the Commonwealth's primary road system, which consists of approximately 25,260 miles of toll roads, interstate highways, resource recovery roads, primary roads, secondary roads, rural secondary roads, unclassified roads, and approximately 8,500 bridges.[13] Table 5 presents the existing mileage of the Commonwealth's primary road system as of December 31, 1982.

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12 "History of Kentucky State Highway Organizations, 1792-1939," Kentucky Department of Highways, (1939).

13 Kentucky Transportation Cabinet, Division of Project Development.

TABLE 5

COMMONWEALTH'S PRIMARY ROAD SYSTEM
(in miles)
December 31, 1982

	Rural	Urban	Total
Interstate	597.2	143.6	740.8
Toll Roads	607.2	23.9	631.1
Other State Primary	3,099.7	480.2	3,579.9
Rural Secondary	9,540.6	262.4	9,803.0
State Secondary	7,290.2	505.2	7,795.4
Unclassified	2,438.2	165.3	2,603.5
Adjunct	97.8	6.7	104.5
Total	23,670.9	1,587.3	25,258.2

SOURCE: Preliminary Official Statement, May 1983, Turnpike Authority of Kentucky.

A rather unique element of Kentucky's transportation system is the Kentucky Turnpike Authority. Created in 1960 by the General Assembly, the Authority constitutes a de jure municipal corporation and political subdivision of the Commonwealth. Under a lease back arrangement with the Transportation Cabinet, the Authority is empowered to construct and finance, through the issuance of revenue bonds, toll road projects, resource recovery road projects and proposed economic development road projects. As of March 31, 1983, the Authority had $740,939,000 of revenue bonds outstanding.[14] Under its arrangement with the Authority, the Commonwealth has received 631.1 miles of parkway roads and under the resource recovery amendments, has financed the construction or reconstruction of numerous systems designed to serve as heavy-duty roadways capable of carrying coal transporting vehicles. The 1980 Kentucky General Assembly, acting on a finding that highways and roads vital to the economic development of Kentucky were deteriorating, amended the 1960 legislation and empowered the Authority to issue $300 million of revenue bonds to construct or reconstruct roads which enhance economic development in the Commonwealth.

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14 IBID.

Historical Expenditures

Kentucky derives revenues for highway and bridge construction, reconstruction, and maintenance from three major sources: Federal Aid, Turnpike Authority, and the State Road Fund. Like most other states, Kentucky levies various usage taxes to provide revenue for its highway system. The predominate user charge is a motor fuels tax at the rate of nine percent (9%) per gallon of fuel sold. Of the total revenues received on this excise tax, forty four and one-half percent (44.5%) is allocated as revenue sharing to county and local governments for construction and maintenance of rural and urban roads. Other major sources of tax revenue which constitute the State Road Fund include the motor vehicle registration tax, operators license revenue, weight distance tax, and the motor vehicle usage tax.

From fiscal year 1975 through the third quarter of fiscal year 1983, the Commonwealth of Kentucky expended nearly $3 billion on the construction of Federal aid and non-Federal aid highways and bridges. (Table 6). Of this amount, nearly $1.4 billion came from the Federal aid funds. During the same period, nearly $700 million was expended on the maintenance of these systems.

TABLE 6

HISTORICAL EXPENDITURES, FEDERAL-AID, NON-FEDERAL AID, FOR CONSTRUCTION AND MAINTENANCE FISCAL YEAR 1975 THROUGH THIRD QUARTER 1983 (in millions of dollars)

	Fiscal Year									
	1975	1976	1977	1978	1979	1980	1981	1982	1983 (3rd Qtr)	Total
Total Construction	214.7	251.2	226.2	288.7	391.6	497.1	429.6	343.4	268.2	2,910.7
Federal-Aid	119.6	133.7	123.0	133.6	172.8	198.4	200.7	156.8	136.6	1,375.2
Turnpike Authority	10.0	6.0	10.8	28.7	98.6	148.4	123.6	73.5	33.4	533.0
State Road Fund	82.9	106.6	80.2	117.5	112.5	144.6	102.9	109.6	94.1	950.9
Other	2.2	4.9	12.2	8.9	7.7	5.7	2.4	3.5	4.1	51.6
Maintenance	60.3	66.8	71.5	78.3	87.8	93.5	86.8	91.3	62.0	698.3
State Road Fund	60.3	66.8	71.5	78.3	87.8	93.5	86.8	91.3	62.0	698.3

SOURCE: Division of Accounts, Kentucky Transportation Cabinet

Investment Needs

Questions exist over definitions or interpretations of need in the area of transportation infrastructure, particularly highways and bridges. To measure the investment need of Kentucky's highway system based on criteria of highest acceptable standards is desirable, yet unrealistic. At the same time, to measure those needs based on projected available revenues is also not satisfactory. Therefore, one solution is to assess investment need based on assumptions falling between these two extremes.

The Transportation Cabinet's Highway and Bridge Program 1982-88 planning document provides estimates of future expenditures for highway and bridge projects in the Commonwealth. In the next six fiscal years, over 880 scheduled construction and reconstruction projects are to be undertaken at a projected cost of $3,046.9 million (Table 7). However, this planning document does not represent a satisfactory investment need estimate since it is constrained by projected available revenues.

TABLE 7

HIGHWAY PROGRAM FOR THE KENTUCKY TRANSPORTATION CABINET
(in millions of dollars)

Fiscal Year	Federal Aid	State Funds	Total
1984	$ 497.9	$ 158.6	$ 656.5
1985	396.2	108.9	505.1
1986	435.9	22.7	458.6
1987	322.0	301.9	623.9
1988	132.6	16.7	149.3
1989	145.5	23.3	158.9
	$ 1,930.1	$ 632.1	$ 2,562.2
Amount of Costs for Phases Underway			$ 484.7
Total Amount of Funds Included in Six-Year Program			$ 3,046.9

SOURCE: Division of Program Management, Kentucky Transportation Cabinet--Based on May 1, 1983 update of the Priority Highway Program.

In addition to this constraint, the Highway and Bridge Program document plans only through fiscal year 1987. Within the Transportation Cabinet, it is felt that data on Transportation Fund revenues and Federal-Aid funding are not adequate to project the level of expenditures in fiscal year 1988 and 1989. Furthermore, fiscal year 1984 expenditures are high due to an unusual increase in Federal-Aid funds.

Backlog Needs

Although many states use a Federal Highway Administration computer-derived adequacy rating system to determine future needs and their associated costs, Kentucky uses the system in a limited way. The Kentucky Transportation Cabinet's Department of Highways, Division of Project Development performs adequacy ratings to determine backlog needs for existing rural major highways only. The Transportation Cabinet's Adequacy Ratings for the Rural Major Highways in Kentucky[15] identifies a backlog of investment need for existing rural major highways.

Using the Federal Highway Administration's computer programs, highway systems are rated by four major elements which total to 100 points: condition elements (35 points), safety elements (25 points), service elements (30 points), and operational elements (10 points). Any mileage which falls below a threshold of 55 points represents the bottom 20 percent of roadway mileage inventoried in the report. Rural highway mileage receiving a rating of 55 points or less can be divided into four major categories: Interstate, Federal-aid primary, Federal aid secondary, and non-Federal aid state maintained. A subset of each of these categories is made as to number of lanes and type of terrain (flat, rolling or mountainous) covered. A unit cost per mile derived from the Kentucky Transportation Research Program's report, Allocation of Transportation Costs to Users[16] can be applied to each major category of highway by the number of lanes and type of terrain in each. This unit cost per mile is composed of the cost per mile of preliminary design and engineering, right-of-way, utilities, grade and drain, and pavement and shoulder construction. A total backlog investment need estimate for existing rural major highways of $5,833 million (1982 dollars) can be made from these data (Appendix A). Due to a lack of reliable data, this estimate does not include urban highway systems.

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15. Kentucky Transportation Cabinet, Division of Project Development, "Adequacy Ratings for Rural Major Highways in Kentucky," (January 1983).

16. Kentucky Transportation Research Program, "Allocation of Transportation Costs to Users," (May 1982).

A backlog need for rural major highway system bridges can be estimated using a technique similar to that used for rural major highways. Using FHA computer programs, an adequacy rating is made for rural major bridges. A corresponding cost per square foot is employed as derived from the Kentucky Transportation Research Program document Allocation of Transportation Costs to Users.[17] Type of highway system, i.e., Federal-aid interstate, Federal-aid primary, Federal-aid secondary and Non-Federal-aid state maintained, as well as the number of lanes on each bridge is inventoried. Bridges receiving 50 points or less (par value 100) represent the bottom 20 percent of the bridges inventoried. Using this method (Appendix A), a backlog need of $345.1 million (1982 dollars) can be estimated.

Although not all highway miles and bridges rated 55 and 50 points or less respectively, would require the maximum cost to reconstruct, the above estimates provide a reasonable estimate of backlog investment needs.

Future Needs

As mentioned previously, the University of Kentucky's Kentucky Transportation Research Program's 1982 research report, Allocation of Transportation Costs to Users,[18] provides an estimate of how much each class of highway user (i.e., auto, pickups, buses, and trucks) paid for the use of existing highways in Kentucky. To make such estimates, the annual cost of maintaining the existing roadways in the Commonwealth had to be established. It is from these estimates that future needs projections are made.

In the Kentucky Transportation Research Program report, current value costs representing capital investment components of the highway system were developed and used to determine the total annual costs of the system. The six cost components used were: preliminary design and engineering, right-of-way, utilities, grade and drain, pavement and shoulders, and bridges. Unit costs for each of these components except bridges were developed by the Transportation Cabinet's Division of Project Development. For bridges, an economic model was developed which uses data from

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17. IBID.

18. IBID.

recently constructed bridges. Each capital investment component was assigned an expected life. A 50 year life expectancy was calculatedfor preliminary design and engineering, utilities, grade and drain, and bridges. A life expectancy of 100 years was assigned to right-of-way costs and 20 year to pavement and shoulders.

By annualizing capital investments over the life expectancy of each component, annual capital expenditures necessary to maintain the existing Kentucky highway systems in 1980 were calculated at $2,007 million (1980 dollars).[19] By using the Consumer Price Index and converting to 1982 dollars, the estimated annual investment needed increased to $2,270 million.

The $2,270 million calculated annual investment need for Kentucky highways and bridges includes the replacement of each capital investment component at the end of its life expectancy for all highway systems in the Commonwealth at Federal-aid construction standards. This would elevate the Kentucky highway system to the highest Federal standard, a standard which some officials believe is not feasible or necessary. Furthermore, this would mean the reconstruction of non-Federal-aid state maintained roads to Federal-aid standards. Since over 12,000 miles of state maintained roads (nearly 50 percent of total system mileage presented in the report (Table 8) are included in this $2,270 million figure, the estimate over represents the total investment need by approximately 50 percent. Adjusting the above estimate of $2,270 million annual investment need to $1,135 million (in 1982 dollars) is thought to be a more reasonable estimate of need.

TABLE 8

HIGHWAY SYSTEM MILEAGE IN KENTUCKY

Classification	Mileage
Interstate	740.53
Federal-Aid Primary	3,882.35
Federal-Aid Urban	1,792.51
Federal-Aid Secondary	7,706.99
Total Federal-Aid	13,706.99
Non-Federal-Aid State Maintained	12,159.56
TOTAL MILEAGE	25,866.55

SOURCE: "Allocation of Transportation Costs to Users" Table 2 - Kentucky Transportation Research Program, May, 1982.

19. IBID.

With these limitations in mind, the estimate of investment need for highways and bridges was extrapolated to fiscal year 1989. This led to a projected total need of $7,945 million (1982 dollars) for fiscal years 1983 through 1989. Projections beyond fiscal year 1989 would be even less reliable than are those for the earlier period, however, a linear projection would lead to a projected need of $20,430 through the year 2000.

It is obvious that projecting the investment need for Kentucky's highway and bridge system is difficult, given the available data.[20] Estimates of investment need based on available revenues may represent the best method of assessing the needs for highways and bridges since these revenues are predicated on system usage through federal and state fuel taxes. To construct all roadways to the highest standard may not be feasible financially, but may be desirable when considering Kentucky's future economic development. Well constructed and maintained roads are a great incentive to industrial location. The annual capital expenditure level of $1,135 million to maintain Kentucky's highway and bridge system appears to be a reasonable estimate of investment need.

City Maintained Streets and County Maintained Roads

Presently, there are 4,169 miles of city maintained streets and 38,688 miles of county maintained roads in the Commonwealth. Since the Transportation Cabinet does not have responsibility for these systems, very little data is available. Therefore, it is nearly impossible given the time and data constraints to make a reliable estimate of the investment needs of city and county road systems in Kentucky. However, it is reasonable to assume that whatever the estimate may be, it will add substantially to the total investment need for transportation infrastructure.

20. Kentucky Transportation Cabinet, Division of Program Management, "Highway and Bridge Program 1982-1988," (May 1983).

MASS TRANSPORTATION

Currently there are 17 bus mass transportation systems operating in the Commonwealth. However, only six are located in urbanized areas. Furthermore, two of these six are closely linked to major urban areas located in neighboring states.[21] This fact, along with the normal lack of centralization that characterizes these systems, makes it very difficult to compile reliable data for the state as a whole.

The Division of Mass Transportation within the Transportation Cabinet is responsible for providing technical assistance to the various mass transportation systems throughout the Commonwealth. Due to the localized services provided by these systems, the Transportation Cabinet traditionally has not perceived a need for a statewide plan. Generally, it is local conditions and especially financial conditions which determine the existance of a system and its level of service.

Historical Expenditures

From fiscal year 1979 through fiscal year 1983, $65.53 million was expended for capital outlays on the mass transit systems in the Commonwealth. Of this amount, $53.8 million came from Federal sources, most notably Urban Mass Transit Administration (UMTA) grants (Table 9).[22] The Commonwealth's fiscal involvement in mass transportation has been relative small (less than 6 percent).

TABLE 9

HISTORICAL EXPENDITURES
PUBLIC MASS TRANSPORTATION - CAPITAL OUTLAYS
(in millions of dollars)

Fiscal Year	Federal	State	Local	Total
1979	7.9	.49	.990	9.380
1980	8.8	.59	1.200	10.590
1981	9.1	.53	1.500	11.130
1982	17.0	1.50	2.600	21.100
1983	11.0	.73	1.600	13.330
Total	33.8	3.84	7.890	65.530

SOURCE: Transportation Cabinet, Division of Mass Transportation

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21. Kentucky Transportation Cabinet, Division of Mass Transportation.

22. IBID.

Investment Needs

Capital investment needs for mass transportation in Kentucky are not great. This is due primarily to the Commonwealth's predominately rural population. The Division of Mass Transportation projects the investment need for mass transportation in the Commonwealth in fiscal year 1984 through 1988 to be approximately $60 million (Table 10). In addition, the Division provides estimates of the potential source of funds for mass transportation.

As presented in Table 10, future capital investment needs for mass transportation systems in Kentucky will decline slightly. The majority of the funds will continue to flow from the Federal government, with Kentucky state government's share remaining low overall (about 8 percent).

TABLE 10

INVESTMENT NEED FOR MASS TRANSPORTATION
(in millions of 1982 dollars)

Fiscal Year	Federal	State	Local	Total
1984	7.85	.850	1.5	10.200
1985	7.90	.850	1.5	10.250
1986	7.90	.850	1.5	10.250
1987	8.00	.850	1.6	10.450
1988	8.20	.850	1.7	10.750
Total	39.85	4.250	7.8	$ 51.900

SOURCE: Transportation Cabinet, Division of Mass Transportation

AIRPORTS

There are currently 62 publicly owned airports in Kentucky. Of these, 7 have regularly scheduled daily passenger and freight services.[23] Most of these 7 commercial airports are located in the more densely populated areas of the Commonwealth and appear to provide service adequate to the Commonwealth.

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23. IBID.

Much like the mass transportation situation, large urban areas in neighboring states provide daily passenger service to the Commonwealth's population. These urban areas include the airports located at Nashville, Knoxville, and Memphis, Tennessee; Huntington, West Virginia; and Evansville, Indiana.

Historical Expenditure

From fiscal year 1979 through 1983, $26.661 million was spent on airport development projects in Kentucky (Table 11).[24] Of this amount, the Federal share (47%) was only slightly higher than the Commonwealth's contribution (42%), with local governments providing the difference (11%). Overall, expenditures for airport projects in Kentucky have declined since 1979.

TABLE 11

HISTORICAL EXPENDITURES
AIRPORT DEVELOPMENT PROJECTS
(in millions of dollars)

Fiscal Year	Federal	State	Local	Total
1979	3.728	3.547	.204	7.479
1980	2.936	4.318	.594	7.848
1981	3.220	1.619	.891	5.730
1982	1.509	1.021	.944	3.474
1983	1.017	.556	.557	2.130
Total	12.410[A]	11.061[B]	3.190	26.661

A. Fiscal year 1982 and fiscal year 1983 reflect abnormally low percentages of federal funds, caused by a two year "pause" in the Federal program.

B. Fiscal year 1979 and fiscal year 1980 reflect abnormally high percentages of state funds, caused by projects at Jackson and Lake Barkley, Kentucky.

SOURCE: Transportation Cabinet, Division of Mass Transportation

24. IBID.

Investment Needs

The Transportation Cabinet's Division of Mass Transportation is responsible for statewide planning of publicly-owned airports; however, their primary mission is the development of smaller, publicly-owned airports designed to enhance the economic development of various regions of the Commonwealth. To accomplish this goal, the division has developed an Airport Systems Plan. According to the Division of Mass Transportation, plan development has reached the stage where, at current funding levels, the fully developed state airport system may be completed in eight years at a cost of $55 million. This estimate does not include all the future needs of the 7 commercial carrier airports since their future funding and ability to expand is based on Federal funding derived from the tax on commercial tickets.

Given the level of demand for air transportation needed to attract commercial carriers to an airport, it appears unlikely that Kentucky will experience a great need for additional commercial airports. Since many Kentuckians travel to neighboring states to gain access to air transportation, a substantial increase in Kentucky's population would have to occur before major airport development is necessary in the Commonwealth.

RAILROADS

Much like many other states, Kentucky's reliance on railroads to transport goods and particularly coal, dates back several decades. The rail systems operating within the Commonwealth today play a major role in Kentucky's economic development. Currently, there are 10 Class I carriers operating over 3,450 miles of track within the state (Table 12).[25]

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25. IBID.

TABLE 12

MILES OF RAILROAD LINE OWNED AND OPERATED
BY CLASS I CARRIERS IN KENTUCKY

Operating Railroad	Total Kentucky Miles Operated
Seaboard System (formerly L&N)	1,733
Illinois Central Gulf	473
Chesapeake and Ohio	710
Cincinnati, New Orleans and Texas Pacific	198
Southern	135
Norfolk and Western	65
Burlington Northern	12
Baltimore and Ohio	120
Clinchfield	3
Consolidated Rail Corporation	1
Total	3,450

SOURCE: Kentucky Transportation Cabinet, Division of Mass Transportation

The Transportation Cabinet's Division of Mass Transportation is responsible for data collection related to railroads in Kentucky. According to this Division, 373 miles of track have been abandoned in the Commonwealth since 1978. Of this amount, 134 miles have been reclaimed and are now operated by shortline carriers. Up to 208 miles of track potentially could be abandoned within the next year.[26]

Investment Needs

Logically, when a line is abandoned by a carrier it is due to the carrier's inability to generate a profit from its operation of the system. Unfortunately, this may leave shippers and other users of the abandoned line without service. This can threaten the economic stability or development of a community, as well as of firms and industries.

According to the Division of Mass Transportation, there probably will be vigorous opposition to the abandonment of approximately 100 miles of the 208 miles of track vulnerable to abandonment. Generally accepted cost estimates per mile for the acquisition and rehabilitation of abandoned rail lines were provided by the Division of Mass Transportation. When applied to the 100 miles of track, these estimates provide a total investment need of $7 million (Table 13).

26. IBID.

TABLE 13

INVESTMENT NEEDS FOR ABANDONED RAILROADS IN KENTUCKY
(1982 dollars)

$$\frac{\text{Number of Potential Miles Abandoned and Opposed}}{100} \times \frac{\text{(Acquisition + Rehabilitation) Cost Per Mile}}{(25{,}000 + 45{,}000) = \$7{,}000{,}000}$$

SOURCE: Data compiled by: Kentucky Transportation Cabinet, Division of Mass Transportation

Future Funding

Currently, there are no plans for future funding from the Transportation Cabinet for abandoned rail lines. Mass Transportation estimates a potential contribution of approximately $.5 million from Federal sources for a proposed shortline system within the state, but see no consistent Federal funding in the future.

Possible funding to acquire and rehabilitate abandoned rail systems could come from the 1984 General Assembly in the form of appropriations for individual projects. Another possibility is the proposed creation of an abandoned rail line bonding authority empowered to issue revenue bonds so as to finance the acquisition and rehabilitation of abandoned rail lines.

SECTION II: WASTEWATER TREATMENT

Kentucky's publicly-owned wastewater treatment facilities system is highly decentralized. According to the Division of Water in the Natural Resources and Environmental Protection Cabinet, there are 541 wastewater treatment facilities operating within the Commonwealth, of which 257 are publicly-owned municipal systems. The remaining 284 are privately-owned systems regulated by the Public Service Commission. The Public Service Commission reports that nearly 80 percent of these private systems operate with revenues of less than $50,000 and are classified as "package treatment" plants serving small subdivisions or single businesses.[27] Although the Division of Water is responsible for regulating the quality of the various systems, as established by the Clean Water Act, no central planning agency exists to coordinate facilities needs and information.

Beyond their regulatory duties, the Division of Water also administers the EPA's Wastewater Construction Grants Program. As created by Section 201 of the Clean Water Act, this program establishes a 75-25% match, Federal and local share respectively, of funds to finance the construction of publicly-owned wastewater treatment, collection, and disposal facilities.[28]

Historical Expenditures

Between 1975 and 1982, local governments within Kentucky, through Federal grants, loans, and local government contributions, expended a total of over $650 million on new construction of wastewater treatment, collection, and disposal facilities Table 14). This amount includes the EPA Construction Grant Program funds, grants and

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27. Public Service Commission of Kentucky, "Utilities Reporting to the Public Service Commission," (October 29, 1982).

28. Kentucky Natural Resources and Environmental Protection Cabinet, Division of Water, "Wastewater Construction Grants Priority List," (May 5, 1983).

loans from the Farmers Home Administration, grants from the Economic Development Administration, Housing and Urban Development, and the Appalachian Regional Commission. Over $105 million of this amount was incurred in debt, through bond issuances by the local governments.[29]

TABLE 14

HISTORICAL EXPENDITURES FOR WASTEWATER FACILITIES
1975 - 1982
(in millions of dollars)

EPA Construction Grants	Other Federal Grants and Loans	Local debt and Revenues	Total
420.5[A]	90.3[B]	140.0[C]	650.8

SOURCE: A Division of Water, Natural Resources and Environmental Protection Cabinet
B FHA, HUD, EDA, ARC Documents
C Kentucky Local Debt Report - 1982

Future Needs

In order to comply with the provisions of the Clean Water Act, the U.S. Environmental Protection Agency (EPA) periodically issues a needs survey report. The most recent of these reports, the 1982 Needs Survey,[30] presents cost estimates for construction of all needed publicly-owned wastewater conveyance and treatment facilities which includes sewage treatment plants, sewers, and other types of related facilities, for each state, including Kentucky. This report presents cost estimates for both backlog needs for the current population and projected needs for the year 2000 population. The cost estimates presented in the Needs Survey serve as a basis for congressional allotment of funds for the construction grants program, which is the priority list of projects that the EPA will fund.

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29. Kentucky Finance and Administration Cabinet, "Kentucky Local Debt Report 1982," (June 30, 1982).

30. U.S. Environmental Protection Agency, "Needs Survey (1982): Cost Estimates for Construction of Publicly-Owned Wastewater Treatment Facilities," (December 31, 1982).

The Needs Survey breaks the cost estimates down into eight categories: I (secondary treatment); II A (advanced secondary treatment); II B (advanced treatment); III A (infiltration/inflow); III B (major rehabilitation of sewers); IV A (new collecter sewers); IV B (new interceptor sewers); and V (correction of combined sewer overflows).

Table 15 presents the 1982 assessment of Backlog needs and year 2000 needs by category.

TABLE 15

INVESTMENT NEEDS FOR WASTEWATER FACILITIES, 1982 - 2000
(millions of 1982 dollars)

Facility		Backlog Needs 1980 Population	Projected Needs 2000 Population
I	(Secondary Treatment)	294	397
II A	(Advanced Secondary Treatment)	83	112
II B	(Advanced Treatment)	0	0
III A	(Infiltration/Inflow)	104	104
III B	(Major Rehabilitation of Sewers)	5	5
IV A	(New Collector Sewers)	398	477
IV B	(New Intercepter Sewers)	161	524
V	(Correction of Combined Sewer Overflows)	1,450	1,450
	Total	2,499	3,070

SOURCE: Tables 1, 15 and 21: U.S. EPA, 1982 Needs Survey Cost Estimates for Construction of Publicly-Owned Wastewater Treatment Facilities; December 31, 1982.

Long-range needs for publicly-owned wastewater treatment facilities (through the year 2000) coupled with the estimated backlog needs for the current population, reveal a projected estimated total need of over $3 billion.[31]

Needs for wastewater treatment facilities through fiscal year 1987 are perhaps better estimated by the construction grants project list. This project or priority list is the ranking of proposed projects using priority points calculated with a formula designed to reflect the type and degree of pollution. Both the system and the annually produced list are approved by the EPA and used to award grants from the annual allotment of

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31. IBID.

construction grant funds. The project list is generally divided into two sections: List A, projects sponsored by communities having a population greater than 3,500 in 1980; and List B, projects sponsored by communities having a population less than 3,500 in 1980.[32]

Table 16 presents the projected need for List A and B communities thourgh 1987 and the future. The EPA's commitment to financing these needs is a 75-25 percent match in the years 1983 and 1984 and a 55-45 match thereafter. Total projected needs for all categories is estimated at over $858.5 million, with an EPA contribution of $490.8 million and state and local government financing $367.6 million.[33]

TABLE 16

LIST A AND B COMMUNITY WASTEWATER FACILITIES NEEDS
1983 - 1987 (+)
(Thousands of 1982 Dollars)

	1983	1984	1985	1986	1987	Future	
List A	40,865	33,622	29,000	29,000	29,000	452,915	
List B	13,959	4,840	5,181	3,390	6,113	210,624	
Total	54,824	38,462	34,181	32,390	35,113	663,539	858,509

SOURCE: Commonwealth of Kentucky Natural Resources and Environmental Protection Cabinet - Division of Water. Fiscal Year 1983 Construction Grants Project List.

Future Funding

The 1981 Construction Grant Amendments substantially altered the level of future Federal participation in grant awards to publicly-owned wastewater treatment facilities. Perhaps the most important alteration made by the 1981 Amendments was

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32. Commonwealth of Kentucky Fiscal Year 1983 Construction Grants Project List, Natural Resources and Environmental Protection Cabinet, Division of Water.

33. IBID.

in connection to the matching funds proportion. Beginning October 1, 1984, the federal share for any new construction grant will be 55 percent, as apposed to the original 75 percent. The local government match will be 45 percent, an additional 20 percent over the original 25 percent match.

State government in Kentucky has not played a major role in the past in the financing of publicly-owned wastewater treatment facilities in the Commonwealth. This lack of state involvement, coupled with the urban-industrial bias of the Construction Grants Program, will make it even more difficult for the less urban, more rural communities of the state to plan and construct wastewater treatment facilities. This is particularly troubling in light of the projected population growth through in-migration expected in these rural communities, which is anticipated to exceed growth in the urban areas.

State Assistance

As outlined in their contribution to the Strategic Planning and Program Analysis document, the Natural Resources and Environmental Protection Cabinet's Division of Water has recommended that the Commonwealth of Kentucky assist local governments with the new non-Federal share percentage of the Construction Grants Program. At present, the recommendation is that a state match program be created to provide 10 percent of the additional 20 percent which local governments must finance under the 1981 Amendments.

A form of state assistance presently exists in the Kentucky Pollution Abatement Authority. The Authority is an independent public corporation and agency of the Commonwealth created by the 1972 General Assembly. Authority assists local governments within the Commonwealth in the financing of water and solid waste pollution control facilities.

Funds are derived by issuing tax-exempt municipal bonds in the Authority's name. The proceeds are then loaned to local entities, passing through the costs incurred by the Authority on a pro-rata basis. The costs incurred in marketing municipal bonds decrease as the size of the bond issue increases. These economy of size savings are passed on to the local governments receiving assistance on individual bond issues.

Bonds of the Authority carry a minimum "A" credit rating by Moody's. They have a market value which results in lower interest rates than would normally be available to individual local governments entering the municipal bonds independently. There is an estimated interest rate savings of 1/4 to 3/4 percent to communities utilizing the Authority's bond issues over their own.

The Authority receives no state funding. No application fees are charged, but typically 1/10 of one percent is added to the interest rate of each loan to cover Authority administration expenses.

SECTION III: WATER SUPPLY, TREATMENT AND DISTRIBUTION

According to the Natural Resources and Environmental Protection Cabinet's Division of Water, there are presently 1,081 public water system sources operating within Kentucky. This number represents systems which withdraw from surface or ground water sources in excess of 10,000 gallons per day and require a permit to operate from the Division of Water. This process is undertaken solely for the purpose of evaluating Kentucky's water quality and availability, a responsibility of the Division of Water.

Of the 1,081 public water system sources, only 223 are actively regulated by the Public Service Commission. This number includes 44 privately-owned water utilities, 144 water districts, and 35 water associations. The remaining 858 unregulated systems consist of various municipal systems, systems operated by local schools and educational institutions, and systems operated by and serving a single business establishment.[34] In addition, approximately one-third of Kentucky's rural population relies on private wells as a source of domestic water supply.[35]

The supply, treatment, and distribution of water in Kentucky is highly fragmented. No central agency or commission is responsible for the comprehensive planning for water needs in the Commonwealth. At one time, the lack of a central planning authority was of little concern, basically due to the perception that Kentucky possessed an abundant source of potable water. Unfortunately, this assumption is no longer plausible, as demonstrated by the Kentucky Report to Congress on Water Quality 1980-81.[36]

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34. Commonwealth of Kentucky Public Service Commission Report, Utilities Operating in the Commonwealth of Kentucky, October, 1982.

35. Kentucky Report to Congress on Water Quality 1980-1981, Natural Resources and Environmental Protection Cabinet, Division of Water.

36. IBID.

Historical Expenditures

From fiscal year 1975 through fiscal year 1982, nearly $600 million was spent for capital facilities for publicly-owned water supply, treatment, and distribution systems in Kentucky. This figure includes over $250 million in grants and loans from the Appalachian Regional Commission, the Economic Development Administration, and the Department of Housing and Urban Development. The remaining $350 million was incurred through bond issuance by the local governments involved (Table 17).

TABLE 17

HISTORICAL EXPENDITURES FOR PUBLICLY-OWNED WATER SYSTEMS
1975 - 1982
(in millions of dollars)

Gederal Grants and Loans	Local Debt	Total
251.7[A]	347.7[B]	599.4

SOURCE: A. ARC, EDA, FHA, HUD
B. Kentucky Local Debt Report, 1982

Investment Needs

Since no central planning agency for water supply exists, few data are available to estimate Kentucky's investment need for water supply. However, a simple yet seemingly representative estimate can be made based on past capital expenditure levels and projected population levels. This estimate makes the admittedly risky general assumption that expenditures for the last eight fiscal years basically have met the investment need for water supply and that future population increases represent the increase in need for water supply for the Commonwealth.

The University of Louisville's Urban Studies Center estimates a steady increase in Kentucky's population through 2000. From 1982 through 1990, according to preliminary projections, Kentucky's population will grow 12 percent (Table 18). From

1990 through 2000, the population will grow another 12.5 percent. These growth estimates, coupled with historical expenditures for water supply as a base, provide the following data:

1982 - 1990			
$600,000,000	x	12% growth	= $672,000,000

1990 - 2000			
$672,000,000	x	12.5% growth	= $756,000,000

This simple method of projection reveals an estimated investment need of $672 million through fiscal year 1989 and an additional $756 million from 1990 to 2000. The total investment need for water supply, treatment, and distribution is estimated at $1,428.0 million for the period.

These estimates must be used cautiously for several countervailing reasons. First, the figures do not reflect investment costs required to correct existing deficiencies; therefore, the estimates must be increased to include these costs. Second, the increased estimate will overestimate need because (a) not all of the new population growth will be serviced by public systems, (b) variable levels of excess or growth capacity already exists in many systems, (c) system consolidation and regionalization will take advantage of scale economies to improve efficiency and reduce costs, and (d) since future demand is non-linear, a saturation level of service provision will be reached beyond which new construction will not be economically feasible. Third, the figure will need to be increased to reflect the treatment technology costs for controlling new contaminant parameters.

TABLE 18

PRELIMINARY POPULATION PROJECTIONS FOR KENTUCKY

1982	1990	2000
3,752,619	4,215,927	4,746,164

SOURCE: Urban Studies Center, University of Louisville.

Future Funding

Interviews with officials of the various Federal agencies that have granted or loaned funds to Kentucky for water system projects revealed a degree of uncertainty as to future funding levels. Furthermore, the ability of local governments to finance their capital needs for water supply through bonded indebtedness may become more difficult and costly as the amount of debt incurred by the state and local governments exceeds a level some feel is already too high. This raises the issue of whether or not existing systems are capable of financing current and future capital costs from user changes and whether this leads to a central planning and regulation of Kentucky's water supply and distribution system is needed.

SECTION IV: WATER RESOURCES

Dams

As of December 31, 1982, there were 1,023 water barriers located within Kentucky. The Natural Resources and Environmental Protection Cabinet's Division of Water, pursuant to KRS 151.291-151.299, is responsible for inspecting these water barriers. Should it become necessary, the Division of Water has the authority to breach any structure which poses a hazard to human life or property and can subsequently bill the owner of the structure for the costs involved.[37]

In the course of their inspection responsibilities, the Division of Water assigns hazard classifications (A, B, or C) to each of the water barriers. An "A" classification is considered a low hazard, with possible failure causing only the loss of the structure and little or no additional damage to other property. A "B" classification is considered a moderate hazard, with significant damage to property but no loss of life should the structure fail. A "C" classification is considered a high hazard, with possible failure causing loss of life and/or serious property damage.

Of the 1,013 water barriers within the Commonwealth, approximately 63 are owned by various cabinets or agencies of the Commonwealth. Many of these state-owned dams are in need of repair, and represent a liability for Kentucky state government.

Investment Needs

Of the approximately 63 state-owned dams, 33 are in need of repair. As presented in Table 19, this breaks down to 7 "A" classified, 16 "B" classified, and 10 "C" classified structures at a estimated total design and construction cost of $10.939 million (1982 dollars).

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37. Kentucky Natural Resources and Environmental Protection Cabinet, Division of Water.

TABLE 19

STATE-OWNED DAM REPAIR
DESIGN AND CONSTRUCTION ESTIMATE
(in millions of 1982 dollars)

"A" Design/Construction	"B" Design/Construction	"C" Design/Construction	Total
44,500/550,000	395,000/3,815,000	285,000/5,850,000	$ 10,939,500

SOURCE: Natural Resources and Environmental Protection Cabinet, Division of Water.

Given the time frame involved, the $10.945 million should be considered a short-term investment need and therefore be limited to the fiscal year 1989 threshold. To further estimate the investment need for state-owned dams to the year 2000 would be impossible given the data constraints.

Future Funding

Over half of the state-owned dams are eligible for repair or reconstruction monies from a state repair fund created by the General Assembly. In their response to the Strategic Planning and Program Analysis document, the Natural Resources and Environmental Protection Cabinet has requested that the General Assembly continue the appropriation to the repair fund at the rate of $1 million per fiscal year through fiscal year 1989.

Flood Control

Traditionally, the U.S. Army Corps of Engineers is responsible for alleviating flood control problems. However, the Crops is limited, by law, to participate in projects wherein, "the flood discharge is greater than 800 cubic feet per second for the 10 percent flood (one chance in ten of being equalled or exceeded in any given year) under conditions expected to prevail during the period of analysis. Drainage areas of less

than 1.5 square miles shall be assumed to lack adequate discharge to meet the above criterion".[38] Situations which fall below the Corps cutoff criteria are the complete responsibility of state and local governments. For this reason, flood control investment is included in an estimate of Kentucky's water resources infrastructure needs.

Historical Expenditures

To assist local governments in their flood control efforts, the 1978 General Assembly established the Community Flood Damage Abatement Program (CFDAP). Since this capital construction matching fund program began in 1978, about $12.47 million of state funds have been expended on small flood control activities from which the Corps of Engineers is excluded from participation by law.[39]

Investment Needs

An investment need estimate for the smaller flood control projects in Kentucky is not being compiled currently by the Natural Resources and Environmental Protection Cabinet. However, data collected from non-funded applications provide a mechanism by which backlog needs for these projects can be estimated. The submittal dates for the non-funded applications are 1977 through 1982. By using the Consumer Price Index and converting all cost estimates to 1982 dollars, an overall backlog needs estimate of $49,078,110 can be made.

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38. Code of Federal Regulations, Title 33, Part 238.7, p. 482, July, 1980.

39. Kentucky Natural Resources and Environmental Protection Cabinet, Division of Water.

Future Funding

Due to the discontinuance of Federal revenue sharing funds that supported the CFDAP, the Natural Resources and Environmental Protection Cabinet had proposed to phase out the program. However, in their response to the Strategic Planning and Program Analysis document, the Division of Water proposes that the General Assembly appropriate an annual allocation between $300,000 and $500,000 per fiscal year through fiscal year 1989 for support of CFDAP. Using available data, it appears that this level of funding will not be sufficient to meet the investment needs of smaller level flood control activities in Kentucky.

Riverports

Approximately 1,400 miles of navigable waterways exist within or border on the Commonwealth of Kentucky.[40] Located on the various rivers and lakes that make up this mileage are four fully operational and two partially operational publicly-owned or quasi publicly-owned riverports. Furthermore, four additional publicly-owned riverports are in various stages of planning.

Currently no central authority or agency exists which is empowered to plan or coordinate the construction of riverports within Kentucky. However, in the past, there have been state government created entities authorized to financially assist riverport projects once they reached the planning stage. The most recent of these entities was the Kentucky River Port Development Commission, which is now inactive.

Investment Needs

Communications with representatives of the two partially operational riverports and four planned riverports within the Commonwealth produced an estimate of $66 million of investment needs for the construction of publicly-owned riverports. When considering the need and importance of riverport projects to the Commonwealth, it perhaps would be best to limit the time frame of this investment need to fiscal year 1989. To attempt to project the investment need for publicly-owned riverports to 2000 is impossible at this time, given data constraints.

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40. IBID.

Future Funding

Traditionally, the majority of funds used to finance publicly-owned riverports came from Federal government sources. The Corps of Engineers and the Economic Development Administration have contributed heavily to the four operational riverports. However, their ability to continue a high level of funding for Kentucky projects seems unlikely.

Kentucky state government's role in the construction financing of publicly-owned riverports is once again uncertain due to the inactive nature of the Kentucky Riverport Development Commission. At this time, future state involvement could come in the form of a General Assembly appropriation to individual projects.

CONCLUSION

In sum, the infrastructure investment needs of the Commonwealth of Kentucky are considerable. Through fiscal year 1989, over $9 billion of infrastructure needs were identified. This figure includes over $8 billion for transportation, $672 million for drinking water, $859 million for wastewater treatment, and over $126 million for water resources needs.

These need estimates are based on data made available by the responsible cabinets and agencies of Kentucky state government, or in some instances, Federal agencies. In the past, the missions of some of these cabinets and agencies did not call for extensive recordkeeping or planning which is needed to properly assess the future infrastructure needs of Kentucky. Therefore, the results of some infrastructure categories are incomplete, while others have a planning horizon that is shorter than desired for capital planning purposes.

In addition, since the investment needs for human service and development infrastructure are not included in this study, an underestimate of the total investment need for all infrastructure categories in Kentucky occurs. The addition of these two categories would increase the investment need substantially; however, until further capital planning is done in Kentucky, the total impact of these two infrastructure categories is unknown.

Although the results of this study are not conclusive, they reveal the need for more work in the areas of infrastructure assessment and capital planning in the Commonwealth. A single attempt to gauge the future infrastructure needs of Kentucky is not sufficient. A consistent and ongoing planning process is necessary if Kentucky is to meet growing societal demands for infrastructure maintenance, repair, and enhancement.

APPENDIX A

A total backlog investment need for existing rural major highways of $5,833 million (1982 dollars) can be made from the following data:

Highway Classification	Number of Lanes	Terrain	Cost Per Mile	Number Of Miles	Total Cost
Interstate Rural	4	Rolling	3,450,000	20.88	72,036,000
Federal-Aid Primary Rural	2	Flat	2,460,00	6.02	14,809,200
Federal-Aid Primary Rural	2	Rolling	2,230,000	283.48	632,160,400
Federal-Aid Primary Rural	2	Mountainous	3,150,000	72.36	227,934,000
Federal-Aid Primary Rural	4	Flat	2,460,000	.28	688,800
Federal-Aid Secondary Rural	2	Flat	1,575,000	2.51	3,953,250
Federal-Aid Secondary Rural	2	Rolling	1,935,000	1,355.00	2,583,225,000
Federal-Aid Secondary Rural	2	Mountainous	3,070,000	377.62	1,159,293,400
Non-Federal-Aid State Maintained	2	Rolling	1,750,000	190.58	333,515,000
Non-Federal-Aid State Maintained	2	Mountainous	2,775,000	50.03	138,833,250
				(1980 $)	5,157,448,300
				CPI	1.131
				(1982 $)	5,833,074,027

A backlog need of $345.1 million (1982 dollars) can be made for rural major highway bridges based on the following:

Highway Classification	Cost Per Square Foot	Number of Square Feet	Total Cost
Federal-Aid Interstate Rural	$57	109,223	6,225,711
Federal-Aid Primary Rural	$57	2,966,498	169,090,386
Federal-Aid Secondary Rural	$57	1,368,745	78,018,465
Non-Federal-Aid Rural	$53	976,938	51,777,714
		(1980 $)	305,112,276
		(CPI)	1.131
		(1982 $)	345,081,984

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